

Are all hygiene interventions the same?

Science driven tips on how to evaluate and compare infection prevention driven products

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9 April 2024

*New Jersey Association for Food
Protection (NJAFP) Webinar*



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Agenda / Overview

- Introduction / Key Context (chain of infection, infectious dose, microbiome)
- Top Categories / Evidence to Seek:
 - Pathogen Reduction (“germ” removal and/or kill)
 - Safety / Compatibility: to Humans + to the Environment
 - User Experience / Human Factors
 - Cost Effectiveness
- Comparative Analysis + Publication Examples
- Conclusions

Presentation Objectives

- ✓ Presentation Purpose is educational – help you evaluate and choose hygiene products and intervention practices even more wisely
- ✓ This will be framed to highlight the impact on food safety and US markets overall
- ✓ Concisely summarized – Not fully comprehensive!



- Education
 - *Carleton College, BA in Chemistry*
 - *UCLA, PhD in Organic Chemistry*
- Career - Employers
 - *Clorox (laundry, IP, new tech products)*
 - *Dial (laundry, air care, skin care)*
 - *GOJO (PURELL, hand hygiene, surface disinfection, B2B focus)*
- Publishing
 - *>50 co-authored journal publications*
 - *>110 technical conference presentations*
- Consulting
 - *Differentiated new products*
 - *Formulation optimization*
 - *Testing and data creation / evaluation*
 - *Find and develop win-win collaborations*
 - *Presenting / Publishing results*
 - *Goal = Efficiently, effectively add value*
- I usually work for Industry
 - *Industry is not necessarily bad / biased, but...*
 - *Profit (sustainability) matters*
- Personal Biases
 - *Advanced Science & Improved Public Health*
 - *Action*
 - *Collaboration is critical to success*
 - *Peer-reviewed publication process*



What is Hygiene?

- “**Hygiene** is the practice of keeping yourself and your surroundings clean, especially in order to prevent illness or the spread of diseases.”¹

US CDC (Centers for Disease Control & Prevention):

- “Hygiene refers to behaviors that can improve cleanliness and lead to good health, such as [frequent handwashing](#), [facial cleanliness](#), and bathing with soap and water. Many diseases can be prevented through proper hygiene practices, such as covering your cough and sneezes, washing hands after handling animals, and showering before you swim.”²
- “Personal Hygiene” is divided into 7 categories on the CDC website³: “Keeping Hands Clean, Nail Hygiene, Facial Cleanliness, Coughing and Sneezing, Foot Hygiene, Hair and Scalp Hygiene, Menstrual Hygiene”

References:

1. <https://www.collinsdictionary.com/us/dictionary/english/hygiene>
2. <https://www.cdc.gov/hygiene/index.html>
3. <https://www.cdc.gov/hygiene/personal-hygiene/index.html>



Presentation Scope

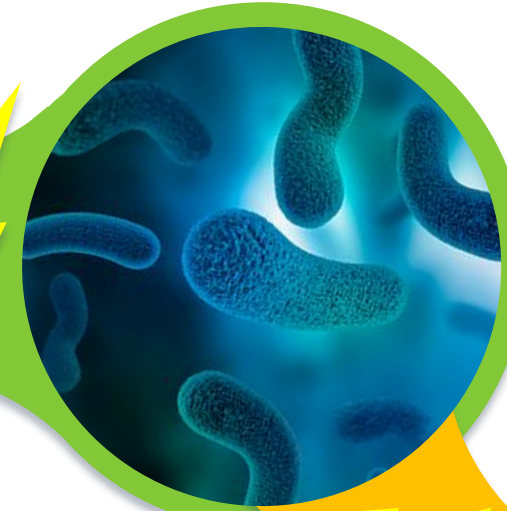
- In Scope = Hand Hygiene + Surface Cleaning / Disinfection; these are foundational to infection prevention!
- A “hygiene product” or a “personal care product” are not defined by law
- Out of Scope = Regulatory details
 - FDA covers Cosmetics, OTC Drugs, Drugs (All Ingredients on label)
 - EPA covers Surface Disinfectants (Active Ingredient + Hazardous Chemicals on label)
- Why Do Hygiene Products Matter? Reduced Risk + Improved Public Health Outcomes
- Emphasis on WHAT to do / What to consider...less on HOW / WHY, but all recommendations are evidence / science based



Next Sick Person

BREAK THE CHAIN!

- ✓ Immunizations
- ✓ Education
- ✓ Treatments



Germs

BREAK THE CHAIN!

- ✓ Diagnose and treatment



How Germs Get In

BREAK THE CHAIN!

- ✓ Hand Hygiene and Cleaning/ Disinfection
- ✓ PPE
- ✓ Personal hygiene
- ✓ First aid



BREAKING THE CHAIN OF INFECTION



Where Germs Live

BREAK THE CHAIN!

- ✓ Hand Hygiene and Cleaning/ Disinfection
- ✓ Personal Hygiene
- ✓ Infection prevention policies
- ✓ Food safety
- ✓ Pest control



Germs Get Around

BREAK THE CHAIN!

- ✓ Hand Hygiene and Cleaning/ Disinfection
- ✓ PPE
- ✓ Food safety
- ✓ Isolation



How Germs Get Out

BREAK THE CHAIN!

- ✓ Hand Hygiene and Cleaning/ Disinfection
- ✓ Personal Hygiene
- ✓ PPE
- ✓ Respiratory etiquette
- ✓ Waste disposal

Reference: Adapted from <https://www.cdc.gov/niosh/learning/safetyculturehc/module-2/3.html>



What is “the infectious dose”?

- The amount of a pathogen that is required to establish an infection is called the “infectious dose.”
- If a person were to be exposed to exactly one copy of a SARS-CoV-2 virus or a single salmonella bacterium, it is unlikely they would become infected.
- The body’s innate immune system (the immune system that does not require identifying specific pathogens) has several different layers of activity that would neutralize that one viral or bacterial organism.
- Another side to the infectious dose is how much of the pathogen is available to infect you.
 - If the pathogen is in low levels in the area where you are exposed, you are less likely to be infected.
 - If the pathogen is available in large quantities, you are more likely to be infected.

Reference: <https://www.galaxydx.com/pathogen-infectious-dose-and-the-risk-of-vector-borne-disease-transmission/>



What is “the infectious dose”?

From [Encyclopedia of Food Microbiology \(Second Edition\)](#), 2014:

Chapter on [Enteropathogenic *E. coli*](#), by H. Brüssow, Pages 722-727

- “The infectious dose of a foodborne pathogen is one of the most important factors determining the apparent transmission mode and thereby the epidemic characteristics of [enteropathogens](#).”
- “For example, [ETEC infections](#) (*Enterotoxigenic Escherichia coli*) have a relatively high infectious dose. Human volunteer studies used challenge doses of $\geq 10^8$ cfu since lower [ETEC](#) doses resulted in too low and inconsistent attack rates.”
- “Other enteropathogens have much [lower doses](#). Adults can be infected with 10^2 cfu of [Shigella](#), and the infectious dose of [rotavirus](#) for children also is low.”
- “This difference explains why ETEC is a classical ‘dirty infection’ with a typical fecal–oral infection route. Rotaviruses, due to their low infectious dose, display epidemiological characteristics of a [respiratory infection](#). Likewise, *Shigella* infections can literally fly on the [foot](#) pads of flies, which connected physically with well-separated latrines and kitchen in a famous Israeli study and thus blur the fecal–oral transmission mode.”





Touch a public surface



Wash Hands



Resident Microbiome grows back

Transient Pathogens

Infectious Dose Level

Skin Microbiome

Baseline Skin Microbiome Level

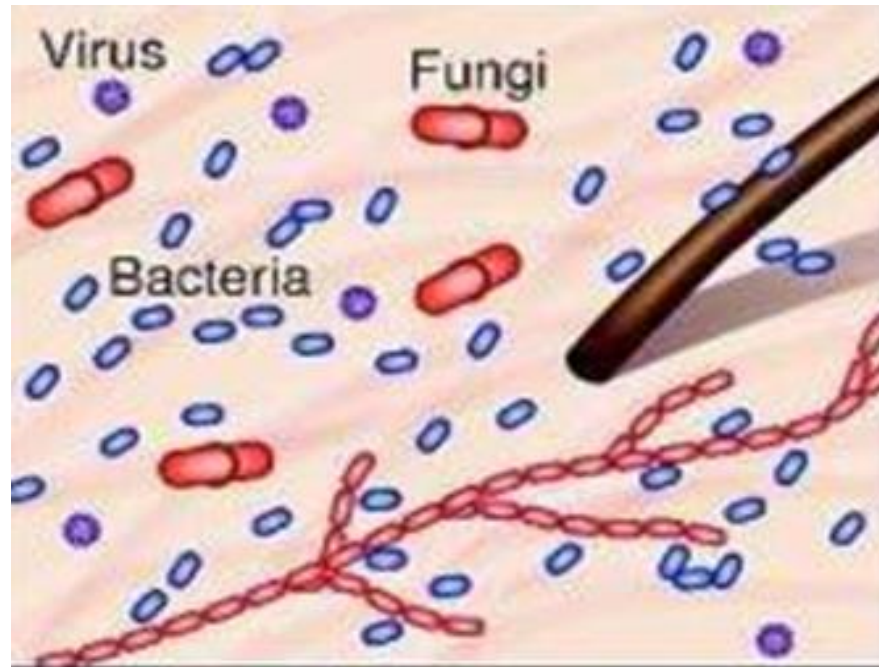


Key Categories to Consider in Evaluating and Choosing Hygiene Products

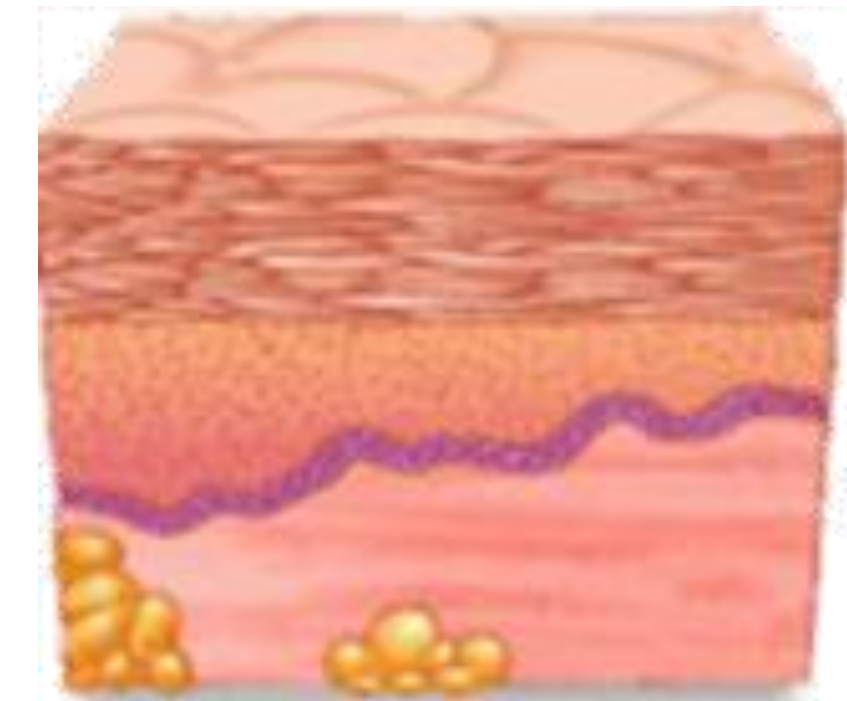


How & Why Formulation Matters

**Cleaning + Antimicrobial Efficacy
(Surface Microbiology)**



**Skin Health / Surface Compatibility
(Maintain, Protect and Repair)**



User-Acceptance (Aesthetics, Feel, Sensory and “Human Factors”)



Measuring the antimicrobial efficacy of hygiene products

Log Reduction (aka “log kill”) vs.
Percent Reduction

Log 10 Reduction	Percent Reduction of Bacteria
1	90%
2	99%
3	99.9%
4	99.99%
5	99.999%

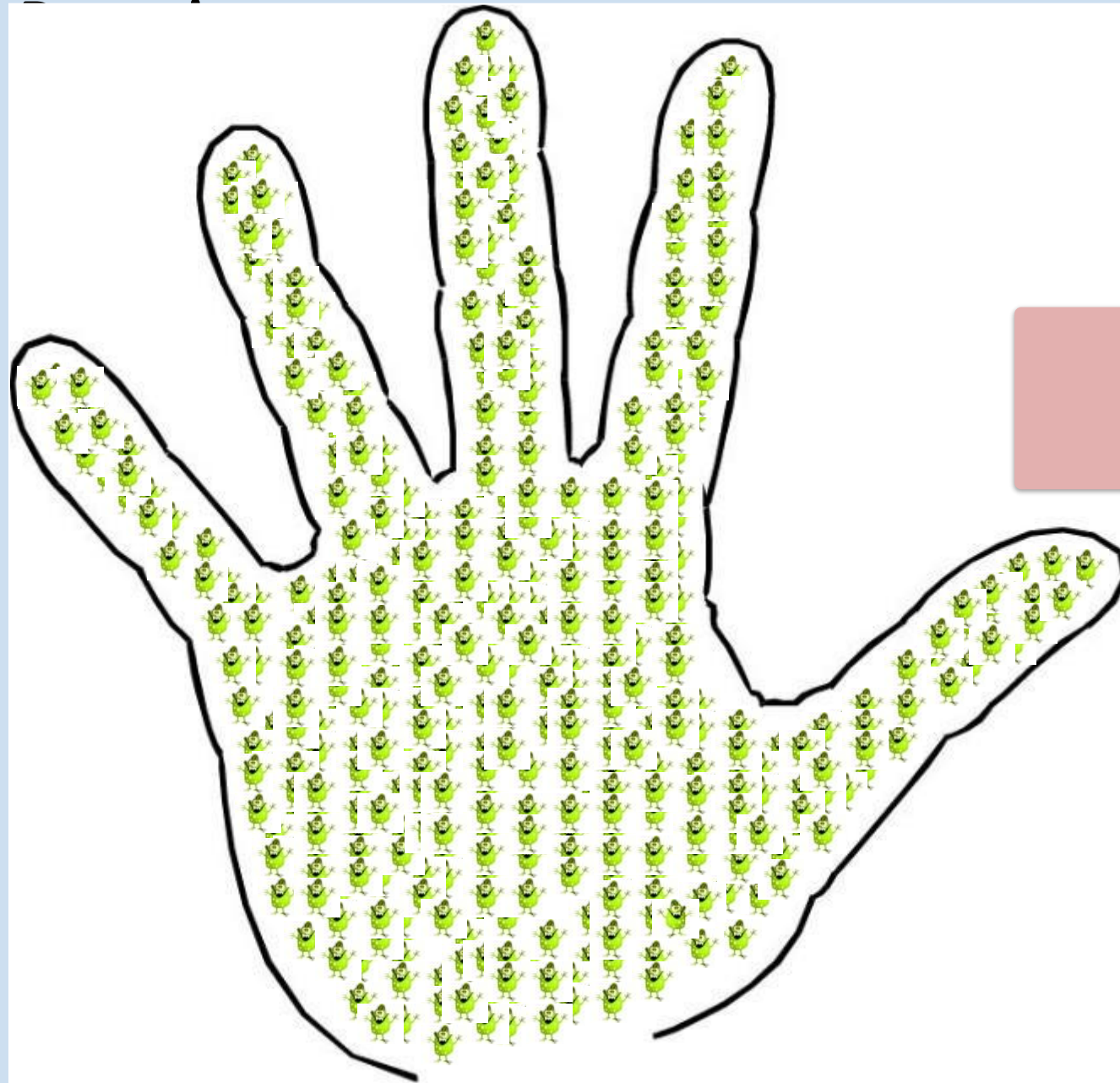
- Multiple ways to measure efficacy:
 - In-vitro (e.g., “time-kill”)
 - In-vivo (e.g., “HCPHW – HealthCare Personnel Hand Wash”)
 - Outcome / Epidemiologic Studies
- Test methods matter – ASTM and EN are most reliable

Higher log reduction = more efficacious formulation

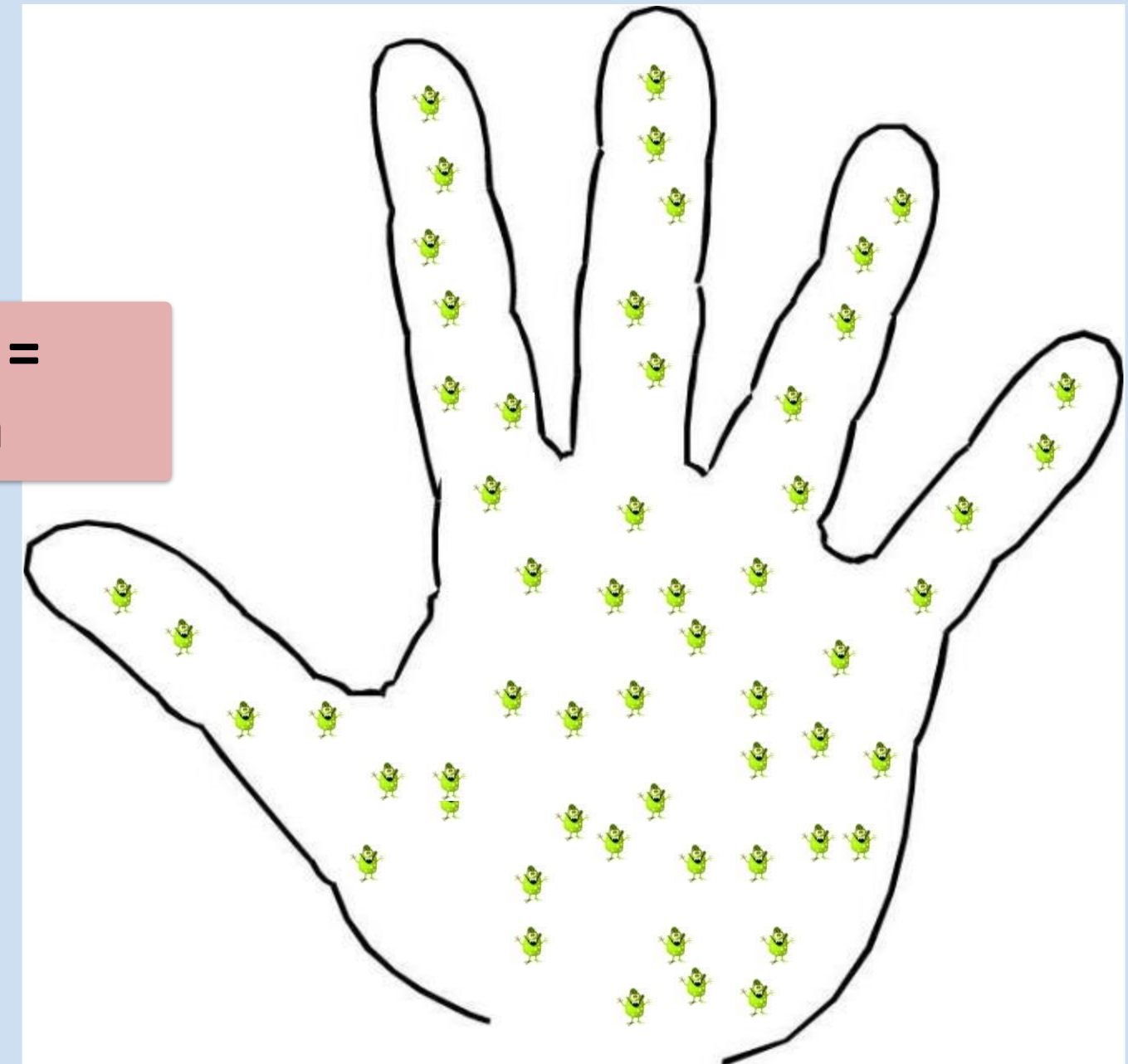


Log Reduction Example

Before Sanitizing = 100,000 (5 logs)



After Sanitizing = 100 Bacteria (2 log) log



99.9% Reduction =
3 Log Reduction

Log Microorganisms Before → Log Microorganisms After = 5 → 2 = 3 Log Reduction

$$[(100,000 - 100) / 100,000] \times 100\% = 99.9\%$$



Safety / Compatibility

- Skin (irritation and allergy)
- Eyes
- Inhalation
- Expected Misuse
- Surface Color
- Surface Integrity
- Residual Impact

Consider Acute (immediate) + Chronic (repeated long-term)





Protocol for Evaluation and Comparison of Tolerability and Acceptability of Different Alcohol-based Handrubs: Method 2

Summary

Study Method

- Approximately 40 volunteer participants using at least 30 ml of product per day
- **Randomised study:** participants are allocated at random (by chance only) to the test products
- **Double-blind study:** neither the participant nor the observer (including data manager) is aware of product content or allocation
- **Cross over study:** each participant tests all formulations in a sequential way

Information and Instructions

- The study usually concerns two hand hygiene products: formulas A and B, but it can be used to compare several products



[Clin Infect Dis](#). 2020 Jun 15; 70(12): 2461–2468.

PMCID: PMC7286366

Published online 2019 Jul 30. doi: [10.1093/cid/ciz717](https://doi.org/10.1093/cid/ciz717)

PMID: [31359053](https://pubmed.ncbi.nlm.nih.gov/31359053/)

Cost-effectiveness of an Environmental Cleaning Bundle for Reducing Healthcare-associated Infections

[Nicole M White](#),^{1,2} [Adrian G Barnett](#),^{1,2} [Lisa Hall](#),^{2,3} [Brett G Mitchell](#),^{4,5} [Alison Farrington](#),^{1,2} [Kate Halton](#),²
[David L Paterson](#),⁶ [Thomas V Riley](#),^{7,8,9} [Anne Gardner](#),² [Katie Page](#),² [Christian A Gericke](#),^{10,11} and [Nicholas Graves](#)^{1,2}



JAMA Network Open

[View Article](#) ▶

[JAMA Netw Open](#). 2020 Aug; 3(8): e2012522.

PMCID: PMC7426752

Published online 2020 Aug 13. doi: [10.1001/jamanetworkopen.2020.12522](https://doi.org/10.1001/jamanetworkopen.2020.12522)

PMID: [32789514](https://pubmed.ncbi.nlm.nih.gov/32789514/)

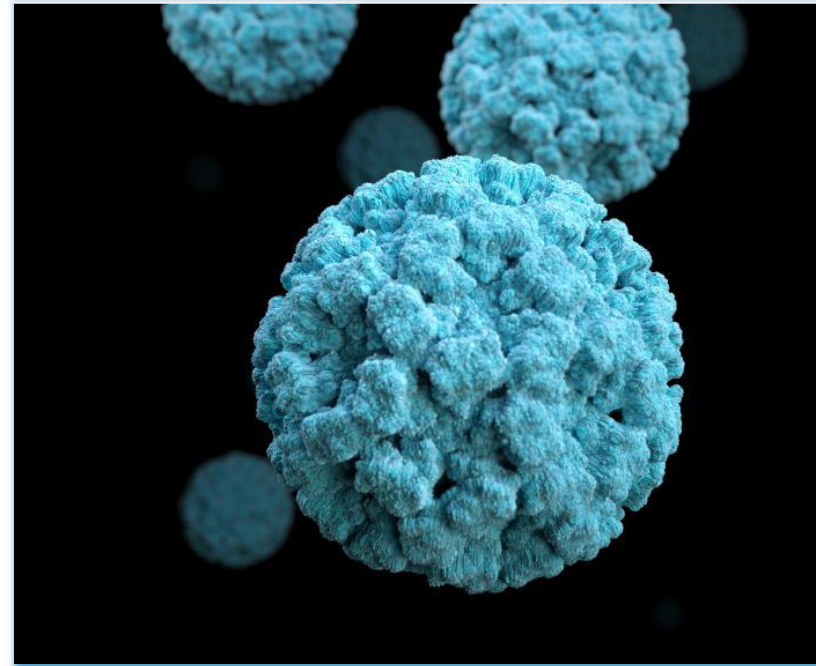
Evaluation of the Cost-effectiveness of Infection Control Strategies to Reduce Hospital-Onset *Clostridioides difficile* Infection

[Anna K. Barker](#), MD, PhD,^{1,2} [Elizabeth Scaria](#), BS,³ [Nasia Safdar](#), MD, PhD,^{4,5} and [Oguzhan Alagoz](#), PhD^{2,3}



Key considerations for selecting surface sanitizers / disinfectants

1-Kill Claims



Does it kill the most prevalent pathogens for your market?

4-Other Factors



- Safe, nontoxic
- Compatible with surfaces and equipment
- Acceptable aesthetics
- Good cleaner
- Easy to use
- Environmentally sustainable
- Economical, Etc...

2- How quickly does it kill prevalent pathogens?



Kill Times

3- Does the product remain wet long enough to kill the pathogen?

- Is reapplication necessary?



Wet Times / Dwell Times



Comparative Analysis



Many sources of information (sometimes conflicting)



Good Sources of Key Information

- Labels (on package + on website + in brochures)
- Technical Bulletin / Product Specification Sheet
- Unpublished Data (via sales typically)
- Webinars
- Conference Presentations
- Journal Publications

Consider the source, the method and the quality / depth of the data and approach!



Effective hygiene products are multifactorial, complex formulations!

Drug Facts

Active Ingredient	Purpose
Chloroxylenol 0.3%	Antimicrobial

Uses

- Handwash to help decrease bacteria on the skin
- Recommended for repeated use

Warnings
For external use only

When using this product do not use in or near the eyes. In case of contact, rinse eyes thoroughly with water.

Stop use and ask a doctor if irritation or rash appears and lasts

Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away.

Directions

- Wet hands
- Apply product and thoroughly cover hands with lather
- Rinse well and dry hands completely

(L) 98817
EXP 06/2017

Drug Facts

Active ingredient	Purpose
Ethyl alcohol 70% v/v	Antimicrobial

Uses

- Hand sanitizer to help reduce bacteria on the skin that could cause disease
- Recommended for repeated use

Warnings
Flammable. Keep away from fire or flame.
For external use only

When using this product do not use in or near the eyes. In case of contact, rinse eyes thoroughly with water.

Stop use and ask a doctor if irritation or rash appears and lasts

Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away.

Directions

- Put enough product in your palm to cover hands and rub hands together briskly until dry
- Children under 6 years of age should be supervised

Other information

- Store below 110°F (43°C)
- May discolor certain fabrics or surfaces

Inactive ingredients Water (Aqua), Isopropyl Alcohol, Caprylyl Glycol, Glycerin, Isopropyl Myristate, Tocopheryl Acetate, Acrylates/C10-30 Alkyl Acrylate Crosspolymer, Aminomethyl Propanol, Fragrance (Parfum)

SDA-36-1301 Patent Pending 9652-658-B

Specific ingredients may improve or inhibit antimicrobial efficacy as well as surface effects of formulations



How do alcohol-based hand rub (ABHR) actually perform on hands?

American Journal of Infection Control 40 (2012) 521-5



Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org



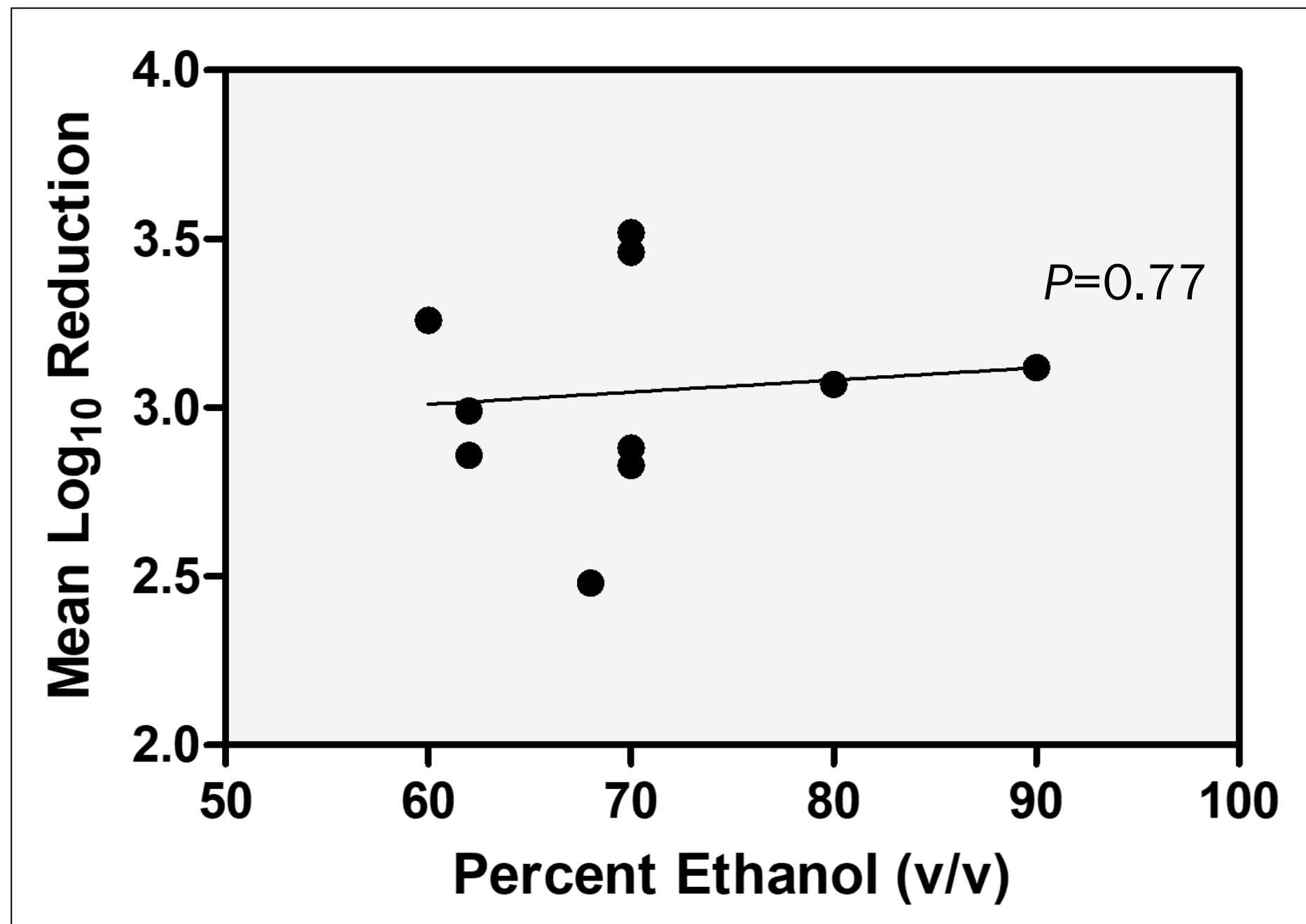
Major article

Comparative efficacy of commercially available alcohol-based hand rubs and World Health Organization-recommended hand rubs: Formulation matters

Sarah L. Edmonds MS^{a,*}, David R. Macinga PhD^a, Patricia Mays-Suko BS^b, Collette Duley BS^b, Joseph Rutter BS^a, William R. Jarvis MD^c, James W. Arbogast PhD^a

“Our results demonstrate the importance of careful ingredient selection and proper formulation when developing ABHRs to maximize antimicrobial efficacy.”





- Method = HCPHW (*in-Vivo*)
- 2 ml application volume
- Test products = Commercial healthcare ABHRs + the WHO ABHR for developing countries
- No relationship between efficacy and ethanol concentration

“In formulated ABHR products alcohol concentration is not the critical determinant of efficacy: formulation matters.”

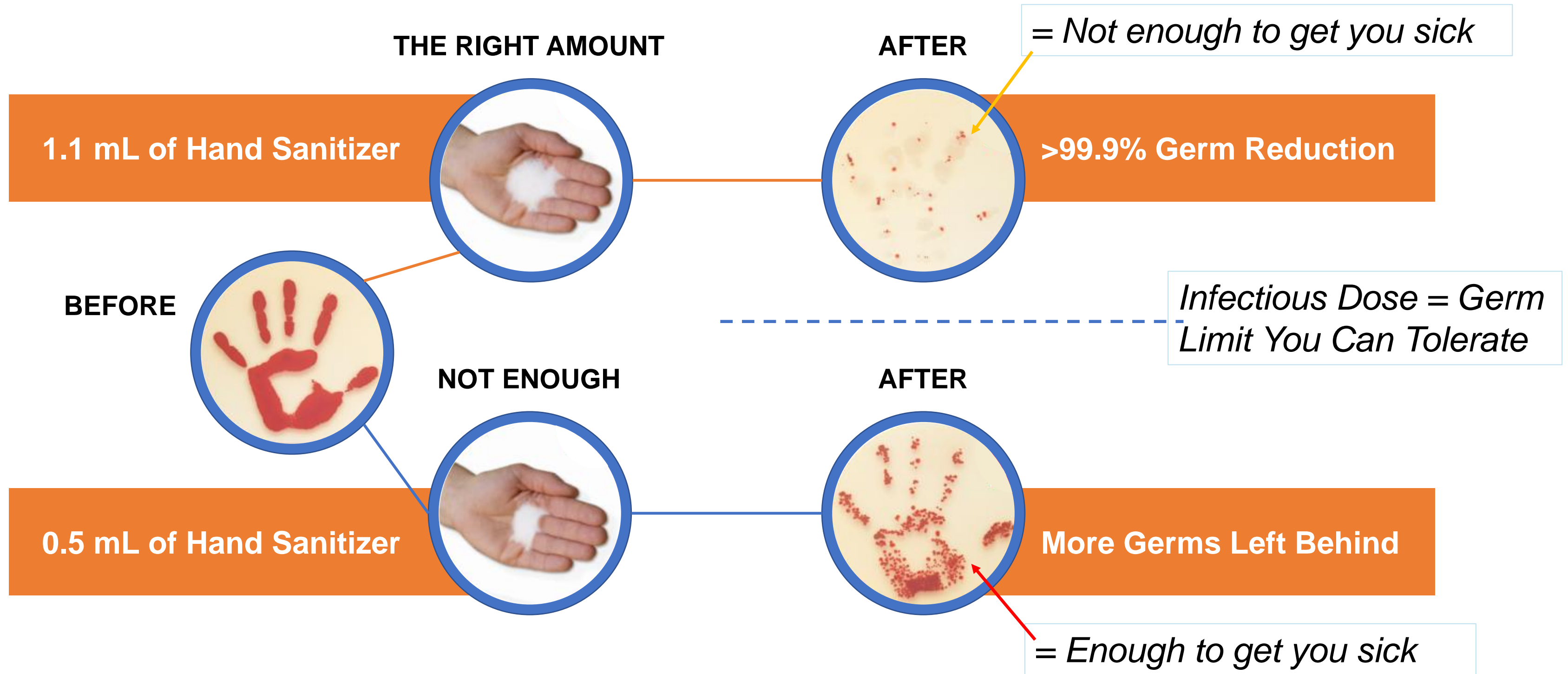
Reference: Edmonds et. al. Am J Infect Control. 2012 Aug;40(6):521-5. doi: 10.1016/j.ajic.2011.08.016.



Myth: More Antimicrobial Active Ingredient (*e.g., alcohol*) Always Means Better Kill



ABHR dosing impact example:



DOSING MATTERS!





Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org



Brief Report

Hand coverage by alcohol-based handrub varies: Volume and hand size matter



Walter Zingg MD ^{a,*}, Tamas Haidegger PhD ^{b,c}, Didier Pittet MD, MS ^a

^a Infection Control Program and WHO Collaborating Centre on Patient Safety, University of Geneva Hospitals and Faculty of Medicine, Geneva, Switzerland

^b Antal Bejczy Center for Intelligent Robotics, Óbuda University, Budapest, Hungary

^c Austrian Center for Medical Innovation and Technology, Wiener Neustadt, Austria





ELSEVIER

Contents lists available at [ScienceDirect](#)

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Brief Report

Randomized controlled trial evaluating the antimicrobial efficacy of chlorhexidine gluconate and para-chloro-meta-xyleneol handwash formulations in real-world doses

James W. Arbogast PhD ^{a,*}, Lisa Bowersock BS ^b, Albert J. Parker PhD ^b, David R. Macinga PhD ^a

^a *GOJO Industries, Inc, Akron, OH*

^b *Department of Mathematical Sciences, Center for Biofilm Engineering, Montana State University, Bozeman, MT*

Chlorhexidine gluconate-based soaps have become the gold standard for handwashing in critical care settings and para-chloro-meta-xyleneol is an effective alternative antibacterial active ingredient. This study benchmarked 2 novel foaming handwashes, compared to a bland soap for antimicrobial effectiveness using the health care personnel handwash method at realistic soap doses (0.9 mL and 2.0 mL). To our knowledge, this is the first published efficacy study on realistic soap doses. Both soaps met Food and Drug Administration success criteria.

[American Journal of Infection Control 47 \(2019\) 726–728](#)



Evaluation of a Novel Alcohol-Based Surface Disinfectant for Disinfection of Hard and Soft Surfaces in Healthcare Facilities

Heba Alhmidi,¹ Sreelatha Koganti,¹ Jennifer L. Cadnum,³ Herleen Rai,¹ Annette L. Jencson,¹ and Curtis J. Donskey^{2,3}

¹Research Service, Cleveland VA Medical Center, Ohio; ²Department of Medicine, Infectious Diseases Division, Case Western Reserve University School of Medicine, Cleveland, Ohio; and ³Geriatric Research, Education and Clinical Center, Cleveland, Ohio

We examined the efficacy of a new 1-step cleaner and disinfectant containing 30% ethanol that is applied as a spray. The product rapidly reduced vegetative bacterial pathogens on carriers and on hard and soft surfaces in healthcare settings, but it did not stain clothing.

Keywords. disinfectant; environment; ethanol; hypochlorite.

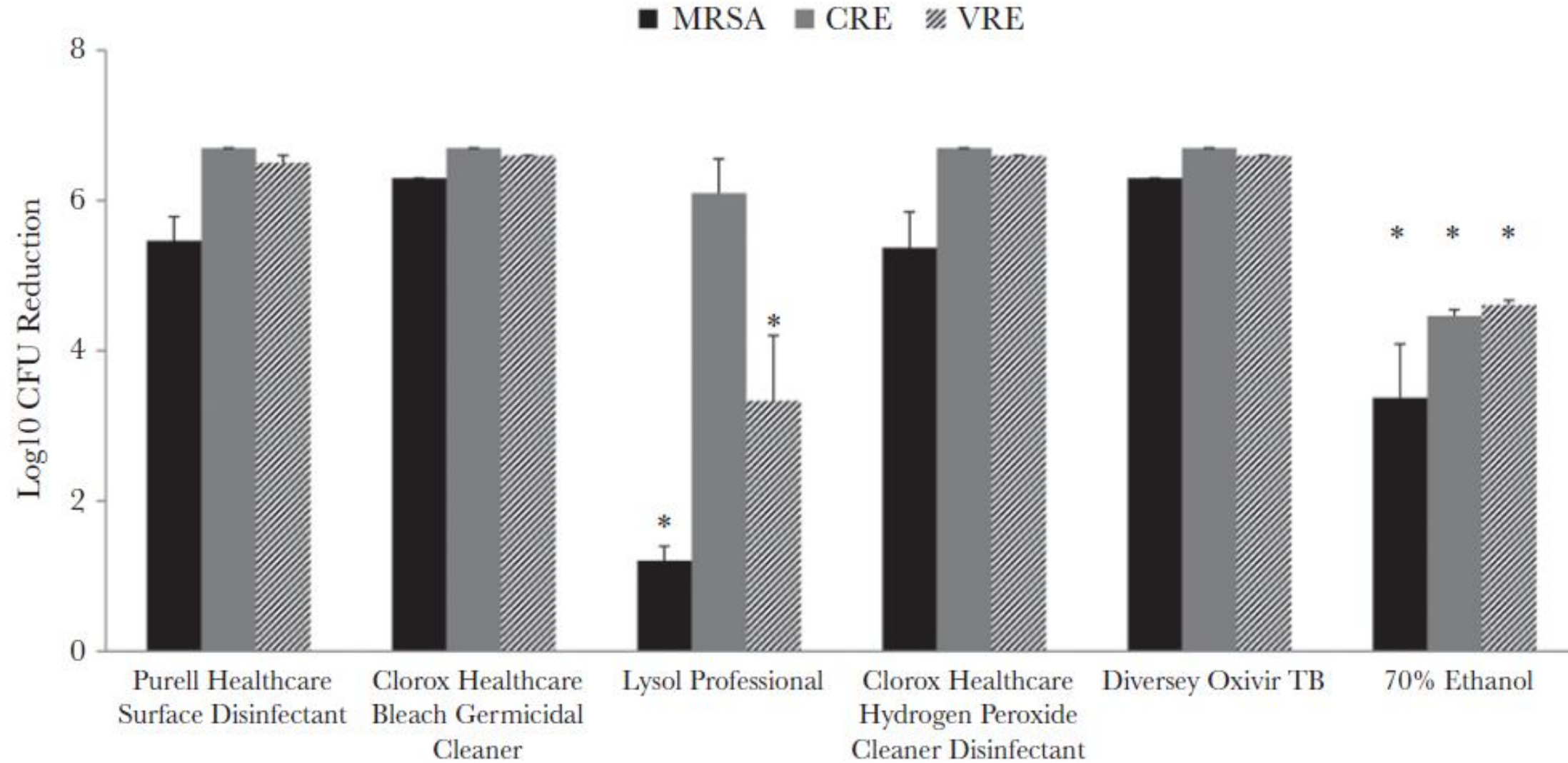


Figure 1. Log reduction of methicillin-resistant *Staphylococcus aureus* (MRSA), carbapenem-resistant *Escherichia coli* (CRE), and vancomycin-resistant *Enterococcus* (VRE) after 30 seconds of exposure to commercial disinfectants or 70% ethanol on steel disk carriers. Log reductions for each disinfectant were calculated in comparison to counts for sterile water exposure. CFU, colony-forming unit. *, $P < .05$.

Reference: Alhmidi H, Koganti S, Cadnum JL, Rai H, Jencson AL, Donskey CJ. Evaluation of a Novel Alcohol-Based Surface Disinfectant for Disinfection of Hard and Soft Surfaces in Healthcare Facilities. *Open Forum Infect Dis.* 2017 Mar 25;4(2).



Interpret “Norovirus” data and claims carefully!



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September 2022 Volume 88 Issue 17 e00807-22

<https://doi.org/10.1128/aem.00807-22>

The Efficacy of Commercial Surface Sanitizers against Norovirus on Formica Surfaces with and without Inclusion of a Wiping Step

Jeremy Faircloth^a, Rebecca M. Goulter ^a, Clyde S. Manuel^b, James W. Arbogast^b, Blanca Escudero-Abarca^a, Lee-Ann Jaykus^a

^aDepartment of Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, North Carolina, USA

“This comparative study demonstrates the variability in anti-hNoV activity of representative surface sanitizers, even those allowed to make label claims based on the cultivable surrogate, feline calicivirus (FCV). It also highlights the importance of wiping ... There is a need for more and better product formulations with demonstrated efficacy against hNoVs...”



3 Essential Interventions to Reduce Pathogens:

Significant reduction in germs after implementing a three-step hand hygiene and surface disinfection program.



Simply placing proven products in prominent locations resulted in a **60% reduction of germs** in the facilities



Adding an educational element to the program, including simple posters and a cleaning checklist, **further reduced the germs found in the facility by 95%** compared to the baseline

Proven
Products

1

Proper
Placement

2

Promote
Usage

3

Infection Risk Reduction Program on Pathogens in High School and Collegiate Athletic Training Rooms

Mark W. LaBelle, MD,^{††} Derrick M. Knapik, MD,^{††} James W. Arbogast, PhD,[§] Steve Zhou, PhD,^{||} Lisa Bowersock, MS,[¶] Albert Parker, PhD,[¶] and James E. Voos, MD^{*††}

Background: Athletic training rooms have a high prevalence of bacteria, including multidrug-resistant organisms, increasing the risk for both local and systematic infections in athletes. There are limited data outlining formal protocols or standardized programs to reduce bacterial and viral burden in training rooms as a means of decreasing infection rate at the collegiate and high school levels.

Hypothesis: Adaptation of a hygiene protocol would lead to a reduction in bacterial and viral pathogen counts in athletic training rooms.

Study Design: Cohort study.

Level of Evidence: Level 3.

Methods: Two high school and 2 collegiate athletic training rooms were studied over the course of the 2017-2018

Labelle et al, Sports Health, 2020

<https://journals.sagepub.com/doi/full/10.1177/1941738119877865>



Emerging Safety Concerns with “Quats”

Quaternary Ammonium Compounds: A Chemical Class of Emerging Concern

William A. Arnold, Arlene Blum, Jennifer Branyan, Thomas A. Bruton, Courtney C. Carignan, Gino Cortopassi, Sandipan Datta, Jamie DeWitt, Anne-Cooper Doherty, Rolf U. Halden, Homero Harari, Erica M. Hartmann, Terry C. Hrubec, Shoba Iyer, Carol F. Kwiatkowski,* Jonas LaPier, Dingsheng Li, Li Li, Jorge G. Muñiz Ortiz, Amina Salamova, Ted Schettler, Ryan P. Seguin, Anna Soehl, Rebecca Sutton, Libin Xu, and Guomao Zheng

Cite This: *Environ. Sci. Technol.* 2023, 57, 7645–7665

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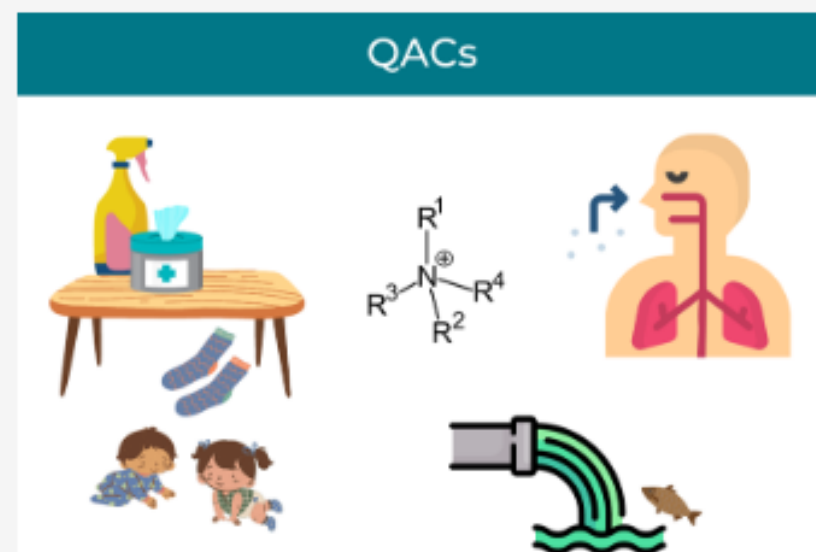
ACCESS |

Metrics & More

Article Recommendations

Supporting Information

ABSTRACT: Quaternary ammonium compounds (QACs), a large class of chemicals that includes high production volume substances, have been used for decades as antimicrobials, preservatives, and antistatic agents and for other functions in cleaning, disinfecting, personal care products, and durable consumer goods. QAC use has accelerated in response to the COVID-19 pandemic and the banning of 19 antimicrobials from several personal care products by the US Food and Drug Administration in 2016. Studies conducted before and after the onset of the pandemic indicate increased human exposure to QACs. Environmental releases of these chemicals have also increased. Emerging information on adverse environmental and human health impacts of QACs is motivating a reconsideration of the risks and benefits across the life cycle of their production, use, and disposal. This work presents a critical review of the literature and scientific perspective developed by a multidisciplinary, multi-institutional team of authors from academia, governmental, and nonprofit organizations. The review evaluates currently available information on the ecological and human health



“Quit the Quats” program emphasizes:

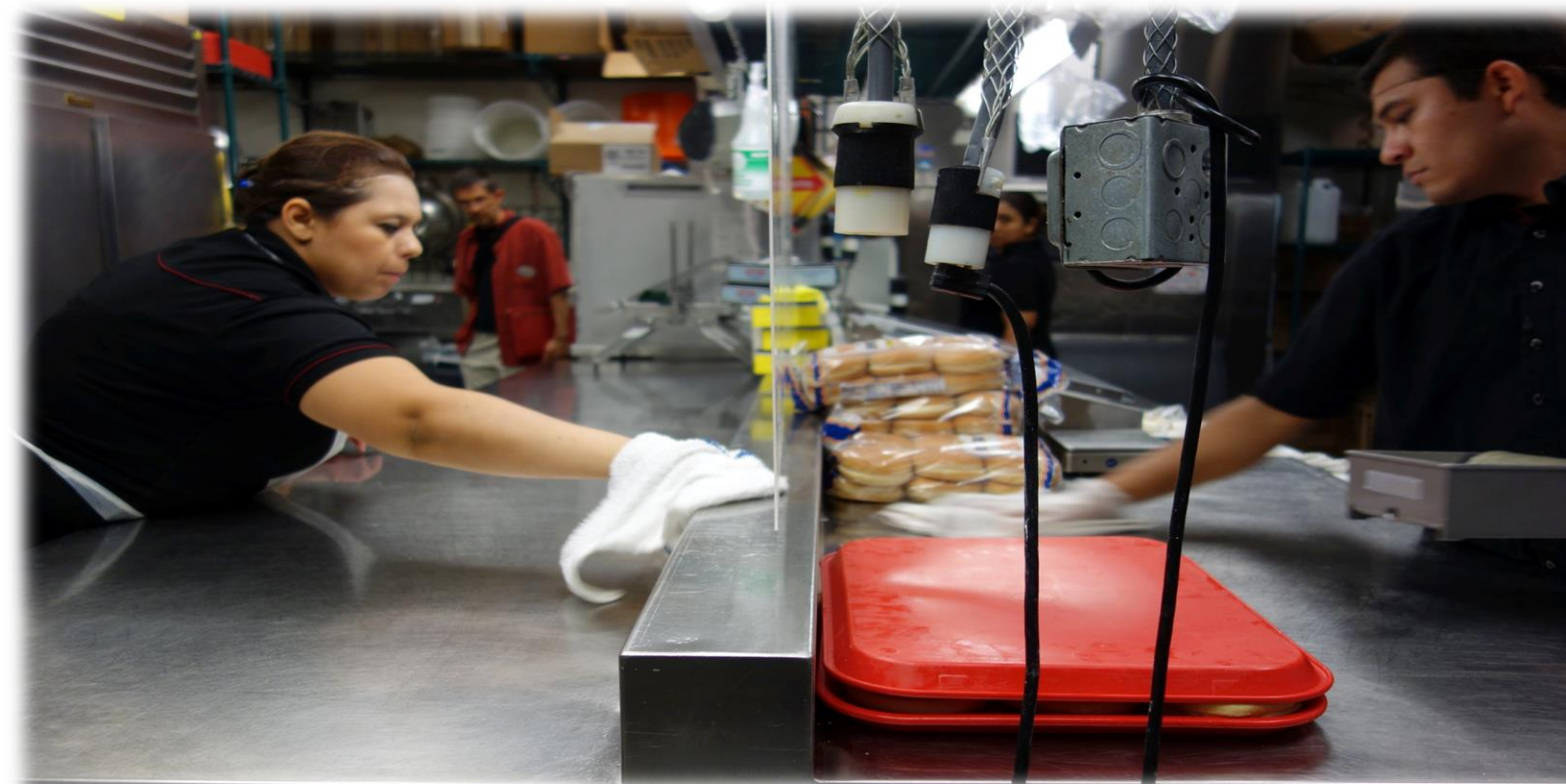
- Human Safety
- Proven Alternatives
- Additional Resources



<https://womensvoices.org/cleaning-with-pesticides-quit-the-quats/#:~:text=Quats%20are%20potent%20skin%20irritants,possibly%20leading%20to%20birth%20defects>




Other Big Picture Considerations

- Dispensers (e.g., “bulk soap”)
- Key Moments
- Routine Clean vs. Events / Outbreaks
- Monitoring & Feedback
- What substrate are you cleaning surfaces with?
- Proper gloving?
- Managing sick employees?
- Risk modeling?
- Public Health guidance?



Original Research Article |  Open Access | 

Quantitative Risk Assessment of Norovirus Transmission in Food Establishments: Evaluating the Impact of Intervention Strategies and Food Employee Behavior on the Risk Associated with Norovirus in Foods

Steven Duret, Régis Pouillot, Wendy Fanaselle , Efstathia Papafragkou, Girvin Liggans, Laurie Williams, Jane M. Van Doren

First published: 01 March 2017 | <https://doi.org/10.1111/risa.12758> | Citations: 27

Journal of Food Protection, Vol. 85, No. 8, 2022, Pages 1177–1191



<https://doi.org/10.4315/JFP-21-423>

Published 2022 by the International Association for Food Protection

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Research Paper

Evaluation of the Impact of Compliance with Mitigation Strategies and Frequency of Restaurant Surface Cleaning and Sanitizing on Control of Norovirus Transmission from Ill Food Employees Using an Existing Quantitative Risk Assessment Model

WENDY FANASELLE  <https://orcid.org/0000-0002-0389-5730>, RÉGIS POUILLOT  <https://orcid.org/0000-0002-6107-5212>,[†]
EFSTATHIA PAPAFRAGKOU, GIRVIN LIGGINS, LAURIE WILLIAMS, AND
JANE M. VAN DOREN  <https://orcid.org/0000-0003-1000-4032>*

U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition, 5001 Campus Drive, College Park, Maryland 20740, USA



CDC Resources Example:



- The CDC Clean Hands Count program is a national educational campaign designed to:
 - Improve hand hygiene knowledge and compliance
 - Address the myths and misperceptions surrounding hand hygiene
 - Empower patients, their families and visitors to act as patient advocates and to work together with their healthcare providers
 - Provide Fact Sheets, Brochures, Posters, etc.
 - Available in English & Spanish

Resources are available at <https://www.cdc.gov/handhygiene/campaign/index.html>



The HandsOn™ 5-Step Process to Overcoming Underwashing



Resources are available at <https://handwashingforlife.org/>

- Emphasis on Hand Hygiene frequency, quality and monitoring in food handling and healthcare settings
- 5-Step Structured improvement process
- A “core handwash” for optimal technique
- SaniTwice® and SaniOnce® designed for situations away from trusted water
- Many implantation resources, tools and videos available to help operators be effective and efficient
- Advocate for evidence based FDA Food Code improvements



Conclusions / Key Takeaways

- Contaminated hands and surfaces play a significant role in the chain of infection of several diseases
- Hand hygiene and surface sanitization / disinfection are important preventive measures to break the chain of infection
- Assess your situation, risks and needs thoughtfully
- Not all hand antiseptics and surface disinfectants are equal: formulation matters for efficacy and outcome performance
- In-Vivo (on real human skin) is a must for hand hygiene product selection
- Dosing / usage volume matters (more = infection risk reduction)
- Learning how to wisely select hand hygiene and surface sanitizers/ disinfectants is an important step in reducing infectious disease
- **Solutions Exist: Seek / Demand the Evidence and Experts for Recommendations**



Thanks!

Questions + Discussion

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*Advice, Info & Connections/
Referrals gladly accepted!*



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